PATENT APPLICATION IFW

AF/1714

Applicants : Tetsuo NISHIKAWA et al

Title : THERMOPLASTIC RESIN COMPOSITION

Serial No. : 09/973 646 Group: 1714

Confirmation No.: 6210

Filed : October 9, 2001 Examiner: Shosho

Atty. Docket No.: Nanjo Case 1

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

FIRST CLASS MAILING CERTIFICATE

Sir:

I hereby certify that this correspondence is being deposited with the United States Postal Service under 37 CFR 1.8 as first class mail in an envelope addressed to: Commissioner for Patents P.O. Box 1450, Alexandria, VA 22313-1450, on April 25, 2005.

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Correspondence: Appellants' Brief on Appeal
dated April 25, 2005
including enclosures listed thereon

190.05/03

PATENT APPLICATION

IN THE U.S. PATENT AND TRADEMARK OFFICE

April 25, 2005

Applicants: Tetsuo NISHIKAWA et al

For: THERMOPLASTIC RESIN COMPOSITION

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APPELLANTS' BRIEF ON APPEAL

Sir:

This Appellants' Brief on Appeal is being filed pursuant to the provisions of 37 CFR 41.37.

REAL PARTY IN INTEREST

Kanebo Limited, Kanebo Gohsen Limited and Sumitomo Rubber Industries, Ltd. are the assignees of the present application and the real parties in interest.

RELATED APPEALS AND INTERFERENCES

There are no related appeals and interferences to the present application.

STATUS OF CLAIMS

Claims 1, 3-7, 12 and 16-23 are currently pending in the application. Claims 2, 8-11 and 13-15 have been canceled. Claims 1, 3-7, 12, 16-19, 22 and 23 have been rejected. Claims 20 and 21 have been objected to. Claims 1, 3-7, 12, 16-19, 22 and 23 are the claims that are being appealed.

STATUS OF AMENDMENTS

No amendments have been filed subsequent to the final rejection dated December 1, 2004.

SUMMARY OF CLAIMED SUBJECT MATTER

Appellants' invention, as defined by independent Claim 1, is directed to a thermoplastic resin composition comprising 2.5-15 wt.% of a styrene-based thermoplastic elastomer and 85-97.5 wt.% of tungsten powder (specification page 2, line 23 and specification page 3, lines 13 and 14).

Claim 3 limits Claim 1 in requiring that the styrene-based thermoplastic elastomer be at least one styrene-based thermoplastic elastomer selected from the group consisting of a hydrogenated polystyrene-polyisoprene block copolymer, a hydrogenated polystyrene-polybutadiene block copolymer and a hydrogenated polystyrene-polyisoprene block copolymer containing a butadiene unit in a polyisoprene moiety (specification page 4, lines 20-27).

Appellants' invention, as defined by independent Claim 4, is directed to a thermoplastic resin molded article comprising 2.5-15 wt.% of a styrene-based thermoplastic elastomer and 85-97.5 wt.% of tungsten powder (specification page 2, lines 23-29).

Claim 5 limits Claim 4 in requiring that the surface hardness of the molded article is 80 or less, when measured by a method defined in JIS K-7215 (specification page 7, lines 7-10).

Claim 6 limits Claim 4 in requiring that the specific gravity of the molded article is 8 or more (specification page 7, lines 20-23).

Claim 7 limits Claim 5 in requiring that the specific gravity of the molded article is 8 or more (specification page 7, lines 20-23).

Claim 12 limits Claim 4 in requiring that the styrene-based thermoplastic elastomer be at least one styrene-based thermoplastic elastomer selected from the group consisting of a hydrogenated polystyrene-polyisoprene block copolymer, a hydrogenated polystyrene-polybutadiene block copolymer and a hydrogenated polystyrene-polyisoprene block copolymer containing a butadiene unit and a polyisoprene moiety (specification page 4, lines 12-27).

Claim 16 limits Claim 1 in requiring that the thermoplastic resin composition additionally comprises at least one member selected from the group consisting of steel, brass, copper, aluminum, nickel, silver, zinc, iron oxide, copper oxide, aluminum oxide, barium sulfate, zinc oxide and molybdenum sulfide (specification page 8, lines 5-12).

Claim 17 limits Claim 16 in requiring that the at least one member be selected from the group consisting of iron oxide, copper oxide, aluminum oxide, barium sulfate, zinc oxide and molybdenum sulfide (specification page 8, lines 10-12).

Claim 18 limits Claim 4 in requiring that the molded article additionally comprise at least one member selected from the group consisting of steel, brass, copper, aluminum, nickel, silver, zinc, iron oxide, copper oxide, aluminum oxide, barium sulfate, zinc oxide and molybdenum sulfide (specification page 8, lines 5-12).

Claim 19 limits Claim 18 in requiring that the at least one member be selected from the group consisting of iron oxide, copper oxide, aluminum oxide, barium sulfate, zinc oxide and molybdenum sulfide (specification page 8, lines 10-12).

Appellants' invention, as defined by independent Claim 22, is directed to a thermoplastic resin composition consisting essentially of 2.5 to 15 wt.% of a styrene-based thermoplastic elastomer, 82-97.5 wt.% of tungsten powder and, optionally, at least one member selected from the group consisting of steel, brass, copper, aluminum, nickel, silver,

zinc, iron oxide, copper oxide, aluminum oxide, barium sulfate, zinc oxide and molybdenum sulfide (specification page 2, lines 23-28 and specification page 8, lines 5-12).

Appellants' invention, as defined by independent Claim 23, is directed to a thermoplastic resin molded article consisting essentially of 2.5-15 wt.% of a styrene-based thermoplastic elastomer, 85-97.5 wt.% of tungsten powder and, optionally, at least one member selected from the group consisting of steel, brass, copper, aluminum, nickel, silver, zinc, iron oxide, copper oxide, aluminum oxide, barium sulfate, zinc oxide and molybdenum sulfide (specification page 2, lines 23-28 and specification page 8, lines 5-12).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following are the grounds of rejection to be reviewed on appeal. The rejection of Claims 1, 3-7, 12, 16-19, 22 and 23 under 35 USC 102(e) as being anticipated by Sakaki et al. The rejection of Claims 1, 4-7, 16-19, 22 and 23 as being unpatentable under 35 USC 102(e) over Gallucci et al. The rejection of Claims 3 and 12 under 35 USC 103(a) as being obvious in view of Gallucci et al in view of Sakaki et al. The rejection of Claims 16-19 under 35 USC 103(a) as being obvious over Sakaki et al in view of Gallucci et al.

ARGUMENT

REJECTION OF CLAIMS 1, 3-7 AND 12 UNDER 35 USC 102(e) OVER SAKAKI ET AL

SAKAKI ET AL IS NOT AVAILABLE AS PRIOR ART AGAINST THE PRESENT CLAIMS

The Sakaki et al reference claims a balance weight for a vehicle wheel comprising a metal clip comprising a hook portion having a cross-sectional shape corresponding to a

flange edge portion of the wheel, and a leg portion for retaining a weight, which is capable of independently close-contacting and fixing to the flange edge portion. The weight is made of a thermoplastic resin composition comprising 2.5-8.0 % by weight of a styrenic thermoplastic elastomer and 97.5-92 % by weight of tungsten powder and having a surface hardness of 80 or less, which is attached to the leg portion of the metal clip wherein the surface hardness of the thermoplastic resin composition is measured by the method defined in Japanese Industrial Standard K7215 (Type D). Since the thermoplastic resin composition disclosed but not claimed in Sakaki et al was invented by the present Applicants, two Declarations Under 37 CFR 1.132 have been filed, and are of record, which unequivocally states that the named inventors in the present application invented the thermoplastic resin composition which is used to manufacture one of the elements of the balance weight claimed in Sakaki et al.

The Examiner did not find the Declarations Under 37 CFR 1.132 satisfactory in that the declaration containing the signatures of inventors Sakaki, Mizoguchi and Nishikawa only contained an unequivocal conclusionary statement without supporting evidence and the second Declaration Under 37 CFR 1.132 containing the signature of inventor Haruta, in combination with the previous Declaration, does not indicate that the Declarations collectively refer to all four inventors. Since all four inventors signed the two Declarations, Appellants respectfully submit that it is clear that the "we" stated in the Declarations collectively refers to all four of the present inventors.

The Examiner also put forth the position that the portion of the Declaration which states that the balance wheel for vehicle weight of Sakaki et al was invented independently by the inventors of U.S. Patent No. 6 364 422 appears to contradict the rest of the Declaration. The Examiner clearly is in error. The Declaration states that the present inventors invented the thermoplastic composition which was

then used by the inventors of Sakaki et al to invent the balance weight which comprises a metal clip, a leg portion for retaining a weight and a weight made of the thermoplastic resin composition. The present inventors invented the thermoplastic resin composition which was then used by the inventors of Sakaki et al to make the claimed balance weight. Since MPEP § 716.10, directed to "Attribution", states that an uncontradicted "unequivocal statement" from the applicant regarding the subject matter disclosed in an article, patent, or published application will be accepted as establishing inventorship, the Examiner's statement regarding "a conclusionary statement without supporting evidence" clearly is in error. The subject matter of the present application is disclosed but not claimed in Sakaki et al since Sakaki et al is directed to a balance weight comprising several elements, one of which is made of the presently claimed thermoplastic composition. Therefore, the Declarations Under 37 CFR 1.132 are sufficient to remove Sakaki et al as a reference against the currently presented claims.

Additionally, the subjects matter of Claims 1, 3-7 and 12 are directly supported in JP 11-95712. Although, as correctly stated by the Examiner, Appellants cannot claim the benefit under 35 USC 119 of JP 11-95712, Appellants respectfully submit that they can use JP 11-95712 to show that the inventions of Claims 1, 3-7 and 12 were actually reduced to practice by the Applicants in Japan prior to the effective filing date of Sakaki et al.

Sakaki et al has an effective U.S. filing date of August 18, 2000. A Declaration Under 37 CFR 1.131, of record in the present application, contained in the Evidence Appendix and entered into the record by the Examiner in the Office Action dated June 14, 2004, establishes a reduction to practice of the subject matter of Claims 1, 3-7 and 12 as of the filing date of JP 11-95712, that is, April 2, 1999. A verified English translation of JP 11-95712 is also contained in the Evidence Appendix and entered into the record by the

Examiner in the Office Action dated June 14, 2004. The Declaration Under 37 CFR 1.131 is signed by only three of the named inventors in the present application because Kazuo HARUTA died on April 16, 2004 and, therefore, was unable to execute the Declaration. Also of record in the present application and enclosed in the Evidence Appendix is an Excuse for Failure to Obtain Joint Inventors Signature, an attached family register and English-language translation thereof, which evidences the death of Kazuo HARUTA on April 16, 2004. This evidence also is entered into the record in the Response dated June 14, 2004. As stated in MPEP § 715.04, a Declaration Under 37 CFR 1.131 can be executed by the remaining joint inventors, when a joint inventor is deceased.

In the final rejection, the Examiner states that it is her position "that given that applicants did not rely upon JP 11-95712 when filing the US application, applicants had not established constructive reduction to practice." The Examiner further states that "applicants are reminded that according to 37 CFR 1.131(b), applicants must establish reduction to practice prior to the earliest effective date of 8/27/99 of the Gallucci and Sakaki prior art references or concept of the invention coupled with due diligence from prior to the earliest effective date to a subsequent reduction to practice or to the filing of the invention." The Examiner further states in the final rejection that "it is the Examiner's position that JP 11-95712 used by applicant shows conception not reduction to practice of his invention. To show constructive reduction to practice, the applicants' conception must be coupled with due diligence as set forth in 37 CFR 1.131(b) cited above."

It appears that the main disagreement between the Examiner and Appellants is whether JP 11-95712 discloses a conception or an actual reduction to practice. The Examiner is basing her position that JP 11-95712 only serves as evidence of the conception of the present invention based on *In re Costello*, 219 USPQ 389. As correctly stated by the

Examiner in the final rejection, in *In re Costello* the applicant filed a Rule 1.131 affidavit arguing that the filing of a parent application constituted a constructive reduction to practice for the continuing application even though the parent application was abandoned prior to the filing of the continuation application. The Federal Circuit stated that an abandoned application, with which no subsequent application was co-pending, cannot be considered a constructive reduction to practice. It can only be used as evidence of conception. However, the present fact situation is different from the fact situation decided in *In re Costello*.

Appellants filed a Rule 1.131 affidavit in which JP 11-95712 was used to establish an actual reduction to practice of the invention defined by currently pending Claims 1, 3-7 and 12. Although, as admitted above, Applicants cannot claim the benefit of JP 11-95712 under 35 USC 119, this application was not abandoned by Applicants and, in fact, was pending as of the filing date of the present application. Appellants can find no U.S. case law which states that, under the current rules which allow the establishment of a date of invention by acts carried out in a WTO member country, a foreign application cannot serve as evidence of a reduction to practice in a 37 CFR 1.131 affidavit. Since JP 11-95712 was not abandoned, suppressed or concealed, it can serve as evidence of a reduction to practice if it is shown that (1) an embodiment was constructed that met every element of the subject claims and (2) the embodiment operated for its intended purpose. It is respectfully submitted that these showings are contained in JP 11-95712. As shown in the verified English-language translation of JP 11-95712, Examples 1-5 produced molded articles from the thermoplastic resin compositions which clearly fall within the scope of Claims 1, 3-7 and 12. The specific gravity and surface hardness of the molded articles of Examples 1-5 were tested and measured as shown in Table 2 of the translation of JP 11-95712 where it is shown that the molded articles of Examples 1-5 have a

sufficient flexibility, a surface hardness of 60 or less, and a large specific gravity of 4.5 or higher.

As stated in the specification of JP 11-95712, it is an object of the application to provide a thermoplastic resin composition which is highly flexible and excellent in processability while having a specific gravity as high as lead and that can be used as a material for forming various kinds of articles requiring both massiveness and flexibility. It is respectfully submitted that Examples 1-5 in JP 11-95712 show that such an object was achieved and, therefore, established a reduction to practice of the invention defined in Claims 1, 3-7 and 12 of the present application.

Since, as Appellants have established above, the invention of Claims 1, 3-7 and 12 were reduced to practice by at least April 2, 1999, which is prior to the filing date of the Sakaki et al reference, it is respectfully submitted that this reference is not available as prior art against these claims.

CLAIMS 1, 4-7 AND 12 ARE PATENTABLE OVER GALLUCCI ET AL

As explained above, Appellants have shown a reduction to practice of the inventions of Claims 1, 4-7 and 12 as of at least April 2, 1999. Since this date is prior to the U.S. filing date of Gallucci et al, it is not available as a reference against the present claims.

Although Gallucci et al is not available as prior art against the present application for the reasons discussed above, it is respectfully submitted that even if it was available, the presently claimed invention is patentably distinguishable thereover. The Gallucci et al reference is directed to a filled polyester molding composition which comprises from about 5 to about 40 wt.% of a polyester resin, from about 60 to about 95% of tungsten metal filler and from 0 to 20 wt.% of an impact modifier. This filled polyester

molding composition has a specific gravity greater than about 3.0 g./cc. At the outset, Appellants wish to point out that Gallucci et al does not anticipate the presently claimed invention under 35 USC 102 as there is no specific disclosure in this reference of a composition which falls within the scope of the present claims. The impact modifier of this reference is optional and the use of a styrene-containing polymer as the impact modifier is also optional. Examples 3 and 4 in Table 1 and Examples 9 and 10 in Table 2 of this reference are the only specific compositions which use styrene-containing resins as impact modifiers. However, Examples 3, 9 and 11 only contain 80 wt.% tungsten powder and Example 4 contains 81 wt.% tungsten powder. Since the currently presented claims require a minimum of 85 wt.% tungsten powder, Gallucci et al clearly does not anticipate the presently claimed invention under 35 USC 102. Moreover, objective evidence contained in the present specification is more than sufficient to rebut any showing of prima facie obviousness under 35 USC 103 over the Gallucci et al reference.

The currently presented claims require that the thermoplastic resin composition of the present invention comprise from 2.5-15 wt.% of the styrene-based thermoplastic elastomer and 85-97.5 wt.% of tungsten powder. In Tables 1 and 2 on pages 14 and 15 of the present specification, Examples of the thermoplastic resin compositions of the present invention are tested against comparative thermoplastic resin compositions which are just outside of the scope of the present claims. That is, Comparative Example 1 only contains 2% of the thermoplastic elastomer, Comparative Example 2 contains 18 wt.% of the thermoplastic elastomer and only 82 wt.% of tungsten powder, Comparative Example 3 contains 18 wt.% of the thermoplastic elastomer and only 82 wt.% of tungsten powder while Comparative Example 4 uses a nylon as the thermoplastic material as opposed to the thermoplastic elastomer required by the present claims. It is to be noted

that Comparative Examples 1-4 are closer to the presently claimed invention than any of the specific compositions disclosed in Gallucci et al. As shown in Table 2 on page 15 of the present specification, the composition of Comparative Example 1 provided a load to the extruder so large that pellets could not be obtained. Comparative Examples 2 and 3 did not provide compositions having sufficient specific gravities as required in the present invention. Comparative Example 4, which utilized nylon, had a hardness that was too high. This is clearly unexpected in light of the disclosure of Gallucci et al and establishes the patentability of the presently claimed invention thereover.

CLAIMS 3, 12 AND 16-19 ARE PATENTABLE OVER SAKAKI ET AL COMBINED WITH GALLUCCI ET AL

As discussed above, Sakaki et al and Gallucci et al are not available as references against the present claims. The Sakaki et al reference has been removed as prior art against the present application by virtue of the 37 CFR 1.132 Declarations and against Claims 3 and 12 by virtue of the 37 CFR 1.131 Declaration. Additionally, Sakaki does not disclose the addition of the elements or compounds of Claims 16-19. Gallucci et al has been removed as prior art also by the 37 CFR 1.131 Declaration and, assuming for argument sake that it is available as prior art under 35 USC 103, as discussed above, the objective evidence in the present specification is sufficient to establish the patentability of the present invention thereover. As such, the rejection of Claims 3, 12 and 16-19 as being unpatentable over any combination of Gallucci et al and Sakaki et al is in error.

For the reasons outlined above, Appellants respectfully submit that the presently claimed invention is patentable over the prior art of record. Reversal of the Examiner is respectfully solicited.

Respectfully submitted,

IN TRIPLICATE

Terryence F. Chapman

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	Sidney B. Williams, Jr.	Reg. No. 24 949

Encl: Claims Appendix
Evidence Appendix
Related Proceedings Appendix
Postal Card

110.0703

CLAIMS APPENDIX

1. A thermoplastic resin composition comprising 2.5 to 15 wt% of a styrene-based thermoplastic elastomer and 85 to 97.5 wt.% of tungsten powder.

2. Canceled.

3. The thermoplastic resin composition of claim 1, wherein the styrene-based thermoplastic elastomer is at least one styrene-based thermoplastic elastomer selected from the group consisting of a hydrogenated polystyrene-polyisoprene block copolymer, a hydrogenated polystyrene-polybutadiene block copolymer and a hydrogenated polystyrene-polyisoprene block copolymer containing a butadiene unit in a polyisoprene moiety.

4. A thermoplastic resin molded article comprising 2.5 to 15 wt.% of a styrene-based thermoplastic elastomer and 85 to 97.5 wt.% of tungsten powder.

5. The molded article of claim 4, wherein a surface hardness of the molded article is 80 or less, when measured by a method defined in JIS K-7215.

6. The molded article of claim 4, wherein a specific gravity of the molded article is 8 or more.

7. The molded article of claim 5, wherein a specific gravity of the molded article is 8 or more.

8.-11. Canceled.

12. The molded article of claim 4, wherein the styrene-based thermoplastic elastomer is at least one styrene-based thermoplastic elastomer selected from the group consisting of

a hydrogenated polystyrene-polyisoprene block copolymer, a hydrogenated polystyrene-polybutadiene block copolymer and a hydrogenated polystyrene-polyisoprene block copolymer containing a butadiene unit in a polyisoprene moiety.

13.-15. Canceled.

16. The thermoplastic resin composition of Claim 1, additionally comprising at least one member selected from the group consisting of steel, brass, copper, aluminum, nickel, silver, zinc, iron oxide, copper oxide, aluminum oxide, barium sulfate, zinc oxide and molybdenum sulfide.

17. The thermoplastic resin composition of Claim 16, wherein the at least one member is selected from the group consisting of iron oxide, copper oxide, aluminum oxide, barium sulfate, zinc oxide and molybdenum sulfide.

18. The molded article of Claim 4, additionally comprising at least one member selected from the group consisting of steel, brass, copper, aluminum, nickel, silver, zinc, iron oxide, copper oxide, aluminum oxide, barium sulfate, zinc oxide and molybdenum sulfide.

19. The molded article of Claim 18, wherein the at least one member is selected from the group consisting of iron oxide, copper oxide, aluminum oxide, barium sulfate, zinc oxide and molybdenum sulfide.

20. The thermoplastic resin composition of Claim 16, wherein the at least one member is selected from the group consisting of steel, brass, copper, aluminum, nickel, silver and zinc.

21. The molded article of Claim 18, wherein the at least one member is selected from the group consisting of steel, brass, copper, aluminum, nickel, silver and zinc.

22. A thermoplastic resin composition consisting essentially of 2.5 to 15 wt.% of a styrene-based thermoplastic elastomer, 85 to 97.5 wt.% of tungsten powder and, optionally, at least one member selected from the group consisting of steel, brass, copper, aluminum, nickel, silver, zinc, iron oxide, copper oxide, aluminum oxide, barium sulfate, zinc oxide and molybdenum sulfide.

23. A thermoplastic resin molded article consisting essentially of 2.5 to 15 wt.% of a styrene-based thermoplastic elastomer, 85 to 97.5 wt.% of tungsten powder and, optionally, at least one member selected from the group consisting of steel, brass, copper, aluminum, nickel, silver, zinc, iron oxide, copper oxide, aluminum oxide, barium sulfate, zinc oxide and molybdenum sulfide.

EVIDENCE APPENDIX

1. Two Declarations Under 37 CFR 1.132
2. Declaration of Prior Invention in WTO Member Country to Overcome Cited Patent or Publication (37 CFR § 1.131)
3. Verified English Translation of JP 11-95712
4. Excuse for Failure to Obtain Joint Inventors Signature
5. Family register and English-language translation thereof

PATENT APPLICATION

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicants: Tetsuo NISHIKAWA et al

For: THERMOPLASTIC RESIN COMPOSITION

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DECLARATION UNDER 37 CFR 1.132

We, the undersigned, hereby declare as follows:

We are the inventors of the invention described and claimed in application Serial No. 09/973 646, filed on October 9, 2001.

We have read and understood the specification and claims of U.S. Patent No. 6 364 422, entitled BALANCE WEIGHT FOR VEHICLE WHEEL, issued on April 2, 2002 and invented by Toshiaki SAKAKI, Kazuo KADOMARU and Tetsuo MIZOGUCHI.

We hereby unequivocally declare that we are the true inventors of the thermoplastic resin composition containing 2.5 to 8.0% by weight of a thermoplastic elastomer and 97.5 to 92% by weight of tungsten powder, and molded articles formed therefrom, and that we disclosed the thermoplastic resin containing 2.5 to 8.0% by weight of a thermoplastic elastomer and 97.5 to 92% by weight of tungsten powder, and molded articles formed therefrom, to the inventors of U.S. Patent No. 6 364 422, and that the use of a thermoplastic resin composition containing 2.5 to 8.0% by weight of a thermoplastic elastomer and 97.5 and 92% by weight of tungsten powder in U.S. Patent No. 6 364 422 and Japanese Patent Application 11-234419, the Japanese priority application of U.S. Patent No. 6 364 422, was based solely on our disclosure

of the subject matter described in the application Serial No. 09/973 646 and the entitled BALANCE WEIGHT FOR VEHICLE WHEEL was invented independently by the inventors of U.S. Patent No. 6 364 422.

We hereby declare that all statements made herein of our own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: September 30, 2003 Tetsuo Nishikawa
Tetsuo NISHIKAWA

Dated: Oct. 1st, 2003 Toshiaki Sakaki
Toshiaki SAKAKI

Dated: Oct. 1, 2003 Tetsuo Mizoguchi
Tetsuo MIZOGUCHI

PATENT APPLICATION

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DECLARATION UNDER 37 CFR 1.132

We, the undersigned, hereby declare as follows:

We are the inventors of the invention described and claimed in application Serial No. 09/973 646, filed on October 9, 2001.

We have read and understood the specification and claims of U.S. Patent No. 6 364 422, entitled BALANCE WEIGHT FOR VEHICLE WHEEL, issued on April 2, 2002 and invented by Toshiaki SAKAKI, Kazuo KADOMARU and Tetsuo MIZOGUCHI.

We hereby unequivocally declare that we are the true inventors of the thermoplastic resin composition containing 2.5 to 8.0% by weight of a thermoplastic elastomer and 97.5 to 92% by weight of tungsten powder, and molded articles formed therefrom, and that we disclosed the thermoplastic resin containing 2.5 to 8.0% by weight of a thermoplastic elastomer and 97.5 to 92% by weight of tungsten powder, and molded articles formed therefrom, to the inventors of U.S. Patent No. 6 364 422, and that the use of a thermoplastic resin composition containing 2.5 to 8.0% by weight of a thermoplastic elastomer and 97.5 and 92% by weight of tungsten powder in U.S. Patent No. 6 364 422 and Japanese Patent Application 11-234419, the Japanese priority application of U.S. Patent No. 6 364 422, was based solely on our disclosure

of the subject matter described in the application Serial No. 09/973 646 and the entitled BALANCE WEIGHT FOR VEHICLE WHEEL was invented independently by the inventors of U.S. Patent No. 6 364 422.

We hereby declare that all statements made herein of our own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: Feb. 12, 2004 Kazuo Haruta.

Kazuo HARUTA

PATENT APPLICATION

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DECLARATION OF PRIOR INVENTION IN WTO MEMBER COUNTRY TO OVERCOME CITED PATENT OR PUBLICATION (37 CFR § 1.131)

This declaration is to establish completion of the invention of this application Serial No. 09/973 646, in a WTO member country, Japan, at a date prior to August 27, 1999, the earliest U.S. effective filing date of U.S. Patent No. 6 300 399 to Gallucci et al, and August 18, 2000, the U.S. filing date of U.S. Patent No. 6 364 422 to Sakaki et al that was cited by the Examiner.

The persons making this declaration are only some of the joint inventors and a suitable excuse is attached for failure of the omitted joint inventor to sign this declaration.

To establish the date of completion of the invention of this application, an exhibit is enclosed as evidence. The enclosed exhibit is a copy of JP 11-95712 and an English-language translation thereof. JP 11-95712 names Tetsuo NISHIKAWA, Kazuo HARUTA, Toshiaki SAKAKI and Tetsu MIZOGUCHI as inventors and has a filing date of April 2, 1999. JP 11-95712 discloses a thermoplastic resin composition comprising 2.5 to 15 wt.% of a styrene-based thermoplastic elastomer and 85 to 97.5 wt.% of tungsten powder.

From this exhibit, it can be seen that the invention of this application was made prior to August 27, 1999, the earliest U.S. effective filing date of U.S. Patent No. 6 300 399 to Gallucci et al, and August 18, 2000, the U.S. filing date of U.S. Patent No. 6 364 422 to Sakaki et al.

This declaration is submitted subsequent to a final rejection.

As a party signing below:

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of first inventor: Tetsuo NISHIKAWA
Signature: Tetsuo Nishikawa
Date: May 17, 2004 Country of Citizenship: Japan
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VERIFICATION OF TRANSLATION

I, Reiko Komaki of 3-9, Saidaiji Takatsuka-cho, Nara-shi, Nara JAPAN

declare as follows:

That I am well acquainted with both the English and Japanese languages, and

That the attached document is true and correct translation made by me to the best of my knowledge and belief of:

Japanese Laid-Open Patent Publication No. 2000-290466
(Japanese Patent Application No. 11-95712)

Date: May 21, 2004

Reiko Komaki

(Signature of Translator)

Japanese Laid-Open Patent Publication No.P2000-290466A

Application No. 11-95712
Date of Application: April 2, 1999
Applicant : KANEBO GOHSEN LIMITED
SUMITOMO RUBBER INDUSTRIES, LTD

Inventor :Tetsuo NISHIKAWA
Kazuo HARUTA
Toshiaki SAKAKI
Tetsuo MIZOGUCHI

【Title of the Invention】 Thermoplastic resin composition

【Claims】

1. A thermoplastic resin composition comprising 2.5 to 15 percentage by weight (wt%) of a thermoplastic elastomer and 85 to 97.5 wt% of tungsten powder.

2. The thermoplastic resin composition of claim 1, wherein the thermoplastic elastomer is a styrene-based thermoplastic elastomer.

3. The thermoplastic resin composition of claim 2, wherein the thermoplastic elastomer is a hydrogenated polystyrene-polyisoprene block copolymer, a hydrogenated polystyrene-polybutadiene block copolymer or a hydrogenated polystyrene-polyisoprene block copolymer containing a butadiene unit in its isoprene moiety.

4. The thermoplastic resin composition of claim 1, 2 or 3, wherein a surface hardness of the thermoplastic resin composition is 80 or less, when measured by a method defined in JIS K-7215.

5. The thermoplastic resin composition of claim 1, 2, 3 or 4, wherein a

specific gravity of the rmoplastic resin composition is 8 or more.

【Detailed Description of the Invention】

【0001】

【Field of the Invention】

The present invention relates to a thermoplastic resin composition having a high specific gravity and an excellent flexibility.

【0002】

【Prior Art and Problems to be Solved by the Invention】

Polymer materials are easy to process and excellent in corrosion resistance, compared with metallic materials. In addition, polymer materials are light and comparatively inexpensive, and have excellent insulation properties, so that they recently have been used widely in many fields as raw materials or structural materials for electrical and electronic parts, machine parts, precision parts, general industrial parts and the like.

【0003】

Moreover, polymer materials are excellent in processability, compared with metallic materials that require a cutting process, a sintering process or the like. In particular, when molded by injection molding, articles having a complex shape advantageously can be molded by only one process.

【0004】

Regarding a balance weight mounted on a wheel in order to adjust a wheel balance of an automobile or the like, it is preferable that the balance weight is as small as possible so as not to spoil the appearance of the wheel. It is also desirable that the balance weight is easy to shape so as to fit the rim diameter of the wheel. For these reasons, conventionally, lead, which is a metallic material having a high specific gravity and an excellent flexibility, has been used as a material for forming the balance weight.

【0005】

However, lead is toxic, and moreover, lead that has entered a human body from the skin and deposited in bones is very difficult to discharge and

accumulates in the body. If lead is accumulated in a human body, lead poisoning may occur. Therefore, it is preferable to use a material other than lead to form the balance weight for a wheel as described above. However, at present, there is no such material having a high specific gravity and an appropriate flexibility as lead.

【0006】

Therefore, it is an object of the present invention to provide a thermoplastic resin composition that is highly flexible and excellent in processability while having a specific gravity as high as lead and that can be used as a material for forming various kinds of articles requiring both massiveness and flexibility such as a balance weight as described above by using a thermoplastic resin, which is a polymer material.

【0007】

【Means for Solving the Problems and effect of the Invention】

To solve the above mentioned problems, the present invention provides a thermoplastic resin composition having a high specific gravity, flexibility and an excellent processability by blending 2.5 to 15 percentage by weight (wt%) of thermoplastic elastomer and 85 to 97.5 wt% of tungsten powder.

【0008】

The thermoplastic elastomer used in the present invention contains a rubber component having elasticity (soft segment) and a molecule-constraining component for preventing plastic deformation (hard segment) in its molecules. The thermoplastic elastomer is a polymer material that behaves like rubber at room temperature, because the molecular motion of the soft segment is locally constrained by the hard segment but that is plastically deformed by an increase in temperature. The thermoplastic elastomer is plasticized at a high temperature and becomes moldable, whereas at room temperature, the thermoplastic elastomer retains its shape and can be deformed easily.

【0009】

More specifically, examples of the thermoplastic elastomer include a

styrene-based thermoplastic elastomer containing polystyrene as the hard segment and (hydrogenated) polybutadiene or (hydrogenated) polyisoprene as the soft segment; an olefin-based thermoplastic elastomer containing polyethylene or polypropylene as the hard segment and ethylene-propylene-diene copolymer (EPDM) or isobutylene-isoprene rubber as the soft segment; a polyester-based thermoplastic elastomer containing polyester as the hard segment and polyether or aliphatic polyester as the soft segment; an urethane-based thermoplastic elastomer containing a urethane bonding as the hard segment and polyether or polyester as the soft segment; and a polyamide-based thermoplastic elastomer containing polyamide as the hard segment and polyether or polyester as the soft segment.

[0010]

It is also possible to use a 1,2-polybutadiene-based thermoplastic elastomer containing syndiotactic 1,2-polybutadiene as the hard segment and amorphous polybutadiene as the soft segment; a trans 1,4-polyisoprene-based thermoplastic elastomer containing trans 1,4-polyisoprene as the hard segment and amorphous polyisoprene as the soft segment; ionomer containing metal carboxylate ion cluster as the hard segment and amorphous polyethylene as the soft segment; a PE/EEA, EVA-based thermoplastic elastomer containing crystalline polyethylene as the hard segment and ethylene-ethylacrylate copolymer or ethylene-vinyl acetate copolymer as the soft segment; and a fluorine-based thermoplastic elastomer containing fluororesin as the hard segment and fluorine-based rubber as the soft segment.

[0011]

The thermoplastic elastomer used in the invention has to be excellent in weather resistance and aging resistance, in view of its use outdoors. For example, if the thermoplastic elastomer is used as a material for a balance weight mounted on a wheel of an automobile whose temperature rises to about 100°C, the thermoplastic elastomer is further required to be heat resistant so as not to be molten at about 100°C. In order to satisfy these requirements, it is desirable that the thermoplastic

elastomer does not have a double bond and is not hydrolyzed. More specifically, a hydrogenated styrene-based thermoplastic elastomer which is produced by hydrogenating the polyisoprene moiety or the polybutadiene moiety constituting the intermediate soft segment of the styrene-based thermoplastic elastomer (SEPS and SEBS respectively) is suitable. Alternatively, it is also possible to use a hydrogenated styrene-based thermoplastic elastomer containing a unit of butadiene in the intermediate isoprene moiety. It is possible to use two or more different kinds of hydrogenated styrene-based thermoplastic elastomers in combination, such as SEPS and SEBS.

[0012]

For example, in the case of the above-described SEPS, the physical properties may change, depending on the styrene content, the molecular weight of isoprene, the molecular weight distribution or the like. More specifically, the SEPS becomes hard as the styrene content is increased, and its strength is increased as the molecular weight of isoprene is increased. The moldability of the SEPS is reduced as its molecular weight distribution becomes sharp. In particular, when the molecular weight of isoprene is large and its molecular weight distribution is sharp, molding of the SEPS is extremely difficult. Regarding the styrene content, about 10 to 65% is generally used. However, for the SEPS used in the present invention, a suitable styrene content is 13 to 30%, preferably about 13 to 20%. Moreover, regarding the moldability of the SEPS, it is preferable that the MFR of the SEPS is 0.05 g/10 min. or more, more preferably 0.5 g/10 min or more, and even more preferably 1 g/10 min or more at 230°C and 2.16 kg. This is because by blending tungsten powder, the moldability is reduced, compared with using a thermoplastic elastomer alone.

[0013]

The styrene-based thermoplastic elastomer as described above is prepared by, for example, the following methods: preparing a block copolymer by living polymerization of styrene, isoprene and styrene or styrene, butadiene and styrene in this order using a monofunctional initiator

such as alkyl lithium (three-step polymerization with a monofunctional initiator) and then performing hydrogenation; or preparing a block copolymer by living polymerization with the same monofunctional initiator in the same manner and coupling with alkyl dihalide (two-step polymerization by coupling), and then performing hydrogenation. The thermoplastic elastomer used in the present invention can be in the form of pellets or powder.

【0014】

It is desirable that the tungsten used in the present invention is in the form of powder, because it is required to be blended uniformly with the thermoplastic elastomer. The particle diameter of the tungsten powder is preferably 300 μm or less, more preferably 2 to 100 μm, even more preferably 3 to 30 μm and most preferably 3 to 27 μm. This is because, if the average particle diameter of the tungsten powder is large, the thermoplastic resin composition is difficult to pass through a mold gate and therefore the moldability is reduced when being molded by injection molding. On the other hand, if the particle diameter of the tungsten powder is too small, the surface area of the tungsten powder is so large that a predetermined amount of thermoplastic elastomer cannot cover the surface of the tungsten powder completely. It is preferable to use tungsten powders of a small particle diameter and a large average particle diameter in combination, because the flowability of the thermoplastic resin composition is improved and the moldability becomes good. For example, it is preferable to use tungsten powders having particle diameter of 5 μm or less and diameter of 27 μm or more.

【0015】

It is also preferable to subject the tungsten powder used in the present invention to a coupling treatment in order to increase its affinity with the resin. Titanate-based, aluminum-based, silane-based coupling agents or the like can be preferably used. In particular, a silane-based coupling agent is preferably used in the present invention, because it improves affinity to the highest extent.

【0016】

It is necessary that the content of the thermoplastic elastomer is 2.5 wt% or more. If the thermoplastic elastomer content in the composition is less than 2.5 wt%, formation of the resin composition is difficult. Even if it can be formed, the moldability of the resin composition is poor.

【0017】

It is preferable that the thermoplastic resin composition of the present invention has a surface hardness of 80 or less, more preferably 60 or less, when measured by the method defined in JIS K-7215 (testing machine type D).

【0018】

It is also necessary that the content of the tungsten powder of 85 wt% or more is necessary. This is because if the content of tungsten powder is less than 85 wt%, the specific gravity of the composition is less than 4.5, which is not sufficient.

【0019】

Therefore, in order to satisfy all of the high specific gravity, a flexibility and a processability (moldability), the contents of the thermoplastic elastomer and the tungsten powder are 2.5 to 15 wt% and 85 to 97.5 wt% respectively.

【0020】

If the thermoplastic resin composition of the present invention is used as a balance weight of a wheel, sports goods or the like, the specific gravity of the thermoplastic resin composition is preferably 8 or more, more preferably 9 or more and even more preferably 10 or more. In order to ensure the above specific gravities, the blending amounts of the tungsten powder are 93.5 wt% or more, 94.5 wt% or more and 95.5 wt% or more respectively. On the other hand, the blending amount of the thermoplastic elastomer necessary to ensure the flexibility required for these applications (as flexible as to be easily bent by hand) is 2.5 wt% or more, preferably 3.0 wt% or more, and even more preferably 4.0 wt%. Therefore, in these applications such as the balance weight, it is necessary to set the blending

amount of the thermoplastic elastomer within the range of 2.5 to 6.5 wt% and the blending amount of the tungsten powder within the range of 93.5 to 97.5 wt%.

[0021]

Furthermore, it is also possible to add to the thermoplastic resin composition of the present invention conventional additives such as antioxidants, thermal stabilizers, ultraviolet absorbers, antistatic agents, crystallization accelerators, coupling agents, lubricants, additive stickers, pigments, dyes, softening agents, anti-aging, crosslinking agents or the like as well as rubber or low molecular weight components, if necessary, within a range that does not inhibit the effect of the present invention.

[0022]

The crosslinking agents are used to crosslink the thermoplastic elastomers, if necessary. The crosslinking agents serve to strengthen the binding among the thermoplastic elastomers and improve resistance against abrasion or damage to a higher extent than compositions with uncrosslinked elastomer. Examples of crosslinking agents include organic peroxides such as 2,5-dimethyl-2,5-t-butylperoxyl-3-hexyne, 2,5-dimethyl-2,5-di-t-butylperoxyhexane, di(t-butylperoxy)-m-diisopropylbenzene, di-t-butyl peroxide, dicumyl peroxide, t-butylcumyl peroxide, t-butyl peroxycumene or the like.

[0023]

The thermoplastic resin composition of the present invention can be manufactured by various kinds of well-known methods such as melt kneading using a single or a double screw extruder, but not limited to those methods. In addition, various kinds of molding processes of the thermoplastic resin composition of the present invention can be employed, such as injection molding and compression molding, but not limited to these processes.

[0024]

Since the thermoplastic resin composition of the present invention is constituted to blend the thermoplastic elastomer having a good

moldability and a flexibility at room temperature and the tungsten powder having a high specific gravity, the thermoplastic resin composition of the present invention has an appropriate flexibility while having a specific gravity as high as or higher than that of lead. In particular, the thermoplastic resin composition of the present invention can be used as a substitute for a balance weight made of toxic lead, and can also be used for various applications such as sports goods, electrical and electronic parts, machine parts and the like.

【0025】

The thermoplastic resin composition of the present invention has excellent moldability and processability because of the use of the thermoplastic elastomer, and it is possible to use various kinds of molding processes including injection molding and compression molding. Furthermore, the used thermoplastic resin composition of the present invention can be recycled by being collected, molten and molded.

【0026】

【Examples】

Hereinafter, the present invention will be described by way of examples. However, the present invention is not limited to these examples. Before referring to the examples, a method for treating tungsten powder with a silane-based coupling agent will be described.

【0027】

(Silane-based coupling method) As the silane-based coupling agent, γ-(2-aminoethyl) aminopropyl trimethoxy silane (SH6020, manufactured by Dow Corning Toray Silicone Co., Ltd.) was used. First, 0.3 wt% of the silane-based coupling agent was dropped into tungsten powder being stirred in a mixer with a high speed stirring blade (super mixer) and the mixture was continuously stirred until the temperature in the mixer reached 120°C. Thereafter, the mixture was cooled and used as a tungsten powder treated with silane-based coupling agent.

【0028】

(Example 1)

As shown in Table 1, 3.0 wt% of a hydrogenated styrene-based thermoplastic elastomer (SEPTON 2063 (manufactured by Kuraray Co., Ltd.), which is a SEPS having a styrene content of 13 wt%, a specific gravity of 0.89, a JIS A hardness of 36, a number-average molecular weight of 1.56E+5 and 4.08 E+4 at two peaks) and 97 wt% of tungsten powder having an average particle diameter of 13 μm (manufactured by Tokyo Tungsten Co., Ltd.) that had been subjected to a coupling treatment were blended and premixed by a mixer with a high speed stirring blade (super mixer). Then, melt-kneading was performed with a single screw extruder having a screw diameter of 25 mm and pellets were obtained. The pellets were heated (80°C) and dried under reduced pressure, and a molded article having a length of 100 mm, a width of 25 mm and a thickness of 2.0 mm was obtained by an injection molding machine. The temperature of the injection molding machine was 240°C and the temperature of the mold was 60°C. The melt flow rate (MFR) of the resin was 2.2 g/10 min. at 230°C and a load of 2.16 kg.

【0029】

(Example 2)

As shown in Table 1, a molded article of the same size was obtained by the same method as in Example 1 except that the pellets were obtained by blending 4.5 wt% of a hydrogenated styrene-based thermoplastic elastomer (SEPTON 4033 (manufactured by Kuraray Co., Ltd.)), which is a SEPS having a styrene content of 30 wt%, a specific gravity of 0.92, a JIS A hardness of 76, a number-average molecular weight of 8.79E+4) and 95.5 wt% of tungsten powder having an average particle diameter of 13 μm (manufactured by Tokyo Tungsten Co., Ltd.) that had been subjected to a coupling treatment and that the temperature for injection molding was 280°C. The MFR of the resin was 0 g/10 min at 230°C and a load of 2.16 kg.

【0030】

(Example 3)

As shown in Table 1, a molded article of the same size was obtained by the same method as in Example 1 except that 14.0 wt% of a hydrogenated styrene-based thermoplastic elastomer (SEPTON 2063 (manufactured by

Kuraray Co., Ltd.)) and 86.0 wt% of tungsten powder having an average particle diameter of 5 μm (manufactured by Tokyo Tungsten Co., Ltd.) that had been subjected to a coupling treatment were blended.

【0031】

(Example 4)

As shown in Table 1, a molded article of the same size by the same method as in Example 3 was obtained except that SEPTON 4033 was used as the thermoplastic elastomer, tungsten powder having an average particle diameter of 3 μm was used and that the temperature for injection molding was 260°C.

【0032】

(Example 5)

A molded article of the same size was obtained by the same method as in Example 1 except that a mixture obtained by blending tungsten powders having an average particle diameter of 5 μm and 27 μm in a blending ratio of 6:4 was used as the tungsten powder.

【0033】

(Comparative Example 1)

As shown in Table 1, 2.0 wt% of a hydrogenated styrene-based thermoplastic elastomer (SEPTON 2063 (manufactured by Kuraray Co., Ltd.)) and 98.0 wt% of tungsten powder having an average particle diameter of 13 μm (manufactured by Tokyo Tungsten Co., Ltd.) that had been subjected to a coupling treatment were blended and premixed in the same manner as in Example 1, and then it was attempted to perform melt-kneading with a single screw extruder. However, the load to the extruder was so large that pellets could not be obtained.

【0034】

(Comparative Example 2)

As shown in Table 1, a molded article of the same size was obtained by the same method as in Example 1 except that 18.0 wt% of a hydrogenated styrene-based thermoplastic elastomer (SEPTON 2063 (manufactured by Kuraray Co., Ltd.)) and 82.0 wt% of tungsten powder having an average

particle diameter of 5 μm (manufactured by Tokyo Tungsten Co., Ltd.) that had been subjected to a coupling treatment were blended.

【0035】

(Comparative Example 3)

As shown in Table 1, a molded article of the same size was obtained by the same method as in Comparative Example 2 except that SEPTON 4033 was used as the thermoplastic elastomer and that the temperature for injection molding was 260°C.

【0036】

(Comparative Example 4)

As shown in Table 1, a molded article of the same size was obtained by the same method as in Example 1 except that 5.7 wt% of Nylon 6 (MC 102 manufactured by Kanebo Gohsen, Ltd.) and 94.3 wt% of tungsten powder having an average particle diameter of 13 μm (manufactured by Tokyo Tungsten Co., Ltd.) that had been subjected to a coupling treatment were blended and that the temperature for injection molding was 260°C.

【0037】

【Table 1】

	Composition			
	Resin component		Tungsten powder	
	type	Blending amount (wt%)	average particle diameter (μm)	blending amount (wt%)
Ex. 1	Thermoplastic elastomer (SEPTON 2063)	3.0	13	97.0
Ex. 2	Thermoplastic elastomer (SEPTON 4033)	4.5	13	95.5
Ex. 3	Thermoplastic elastomer (SEPTON 2063)	14.0	5	86.0
Ex. 4	Thermoplastic elastomer (SEPTON 4033)	14.0	3	86.0
Ex. 5	Thermoplastic elastomer (SEPTON 2063)	3.0	5	58.2
			27	38.8
Com. Ex. 1	Thermoplastic elastomer (SEPTON 2063)	2.0	13	98.0
Com. Ex. 2	Thermoplastic elastomer (SEPTON 2063)	18.0	5	82.0
Com. Ex. 3	Thermoplastic elastomer (SEPTON 4033)	18.0	5	82.0
Com. Ex. 4	Thermoplastic plastic (Nylon 6)	5.7	13	94.3

【0038】

The specific gravity and the surface hardness of the molded articles of Examples 1 to 4 and Comparative Examples 1 to 4 were measured, and the results are shown in Table 2. The measurement of the specific gravity and of the surface hardness was conducted by the method defined in JIS K-7112 and JIS K-7215 (type D of testing machine measuring durometer hardness), respectively.

【0039】

【Table 2】

	Physical properties	
	Specific gravity	Surface hardness
Ex. 1	11.9	25
Ex. 2	9.9	55
Ex. 3	5.0	8
Ex. 4	5.1	40
Ex. 5	11.9	25
Com. Ex. 1	-	-
Com. Ex. 2	4.0	5
Com. Ex. 3	4.2	40
Com. Ex. 4	10.1	90

【0040】

As shown in Tables 1 and 2, the molded articles of Examples 1 to 5 having a content of thermoplastic elastomer in the range of 2.5 to 15 wt% and a blending amount of tungsten powder in the range of 85 to 97.5 wt% have a sufficient flexibility (surface hardness of 60 or less) although having a large specific gravity (4.5 or more). On the other hand, in the molded articles of Comparative Examples 2 and 3 containing 18.0 wt% of thermoplastic elastomer and 82.0 wt% of tungsten powder, contents that are outside of the above ranges, a sufficient specific gravity cannot be provided. In the case of Comparative Example 4 where Nylon 6 was used instead of the thermoplastic elastomer, there is the problem that the hardness is too high although the specific gravity is sufficient.

【0041】

Furthermore, the molded articles of Examples 1 and 3 using SEPTON 2063 as the thermoplastic elastomer have a surface hardness of 25 or less and have an excellent flexibility. Therefore, when an excellent flexibility is required, it is preferable to use SEPTON 2063 than SEPTON 4033. That is, it is desirable to use more flexible thermoplastic elastomer.

【0042】

Regarding the tungsten powder, Example 5 containing tungsten powders of a small diameter and a large diameter in combination advantageously has good moldability because the flowability of the resin is excellent although it is equal to Example 1 in the physical properties.

PATENT APPLICATION

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicants: Tetsuo NISHIKAWA et al
For: THERMOPLASTIC RESIN COMPOSITION
Serial No.: 09/973 646 Group: 1714
Confirmation No.: 6210
Filed: October 9, 2001 Examiner: Shosho
Atty. Docket No.: Nanjo Case 1

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

EXCUSE FOR FAILURE TO OBTAIN
JOINT INVENTOR'S SIGNATURE

As evidenced by the attached death certificate and English-language translation thereof, Kazuo HARUTA died on April 16, 2004 and, therefore, was unable to sign the Declaration Under 37 CFR 1.131.

Date 5-24-04

Terryence F. Chapman
Reg. No. 32 549

Attachment: Death Certificate and
English Translation thereof

VERIFICATION OF TRANSLATION

I, Tomoko Yamaguchi of 4-12-16-407, Nagata, Jyoto-ku, Osaka 536-0022, Japan

declare as follows:

That I am well acquainted with both the English and Japanese languages, and

That the attached document is a partial and faithful translation made by me to the best of my knowledge and belief of:

Certificate for All Hysteresis Matters

Date: May 21, 2004

Tomoko Yamaguchi

(Signature of Translator)

(Partial Translation)

CERTIFICATE FOR ALL HYSTERESIS MATTERS

Permanent Address: 429 Nishiki-machi, Yamaguchi-shi, Yamaguchi

Name: Kazuo HARUTA

Status:

Death

Date of Death: April 16, 2004
Time of Death: 11:52am
Place of Death: Yamaguchi-shi, Yamaguchi
Date of a Notice of Death: April 16, 2004
Person of Notice: a relative, Setsue HARUTA

Issue No. 00140831

It is a document to be certified that these are all matters to be recorded in the register.

May 6, 2004
A Mayor of Yamaguchi-city, Eiichi GOHSHI
(Seal)

（2の1）　全部事項証明

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婚姻	【婚姻日】平成１０年１０月２８日 【配偶者氏名】春田和夫 【従前戸籍】山口県山口市楠木町４番　松井勢津恵

発行番号　00140831

以下次頁

（2の2）　全部事項証明

配偶者の死亡	【配偶者の死亡日】平成１６年４月１６日
	以下余白

発行番号　00140831

これは，戸籍に記録されている事項の全部を証明した書面である。

平成１６年５月６日

山口市長　合志　栄

山口市長印　市民専用

RELATED PROCEEDINGS APPENDIX

There are no related proceedings to the present application.